Genetic Characterization and Estimation Variety Eight of Papaya Genotype

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Abstract
Characterization and prediction of genetic diversity is one of the stages on the papaya plant breeding activities in obtaining the parent plant in accordance with a predetermined idiotipe. Karaktersasi done after exploration and germplasm collection is done. Currently the plant breeding laboratory studies program Agrotechnology Faculty of Agriculture has some papaya genotypes were successfully collected is from the cross, a collection of some areas, collection of research centers Tropical Fruits IPB Bogor and Fruit Research Institute Solok. The general objective is to get a papaya plant breeding better varieties from existing varieties (new idiotipe). Papaya plant characteristics desired by idiotype is a strong plant, short stature and quick to bear fruit, tree hermaphrodite, not the formation of stamens karpeloid (imperfect) or sterile, resistant to pests and diseases and high production. Characteristics of preferred fruit is sweet, flavorful soft, smooth fruit skin, thick flesh is red, round cavity and its shelf-life longer. The study was conducted in Gardens Farmers in Saree Aceh Besar, using eight genotypes of papaya exploration results. Experiments using a completely randomized design were repeated three times. The parameters observed qualitative and quantitative characters on vegetative and generative phase. The results showed that genotype Calina have short stature and fast fruiting as well as high production potential. Merah delima genotype showed a slow germination and growth. From the eigth genotipe papaya tested showed high genetic diversity and high heritability. Therefore, the selection can be done in early generations.
Keywords: characterization, Idiotype, Crosses

Introduction

Papaya (Carica papaya) is one of the most important fruit crops in the fulfillment of calcium and a good source of vitamins A and C (Nakasome and Paull 1998). Besides consumed as fresh fruit, ripe papaya fruit can be processed into beverages, and as raw material for the food industry (Villegas 1997). Productivity papaya in Indonesia in 2004 could reach 73.26 t / ha and decreased to 64.67 t / ha in 2005 (FAO, 2005). Productivity decline is caused by many factors, among others; drought, climate change, pests and diseases. Other obstacles that commonly occur in the cultivation of papaya among which productivity is low, the size of the fruit less as expected, the limited varieties are aged genjah and was short, total dissolved solids is still below 11 0brix and adaptability low against environmental stress, especially drought , kegenangan and pests and diseases (LP- IPB 2001). Papaya utilization mostly as fresh fruit, therefore, the criteria and the character of papaya fruit quality is very important. According to Kader (2002) papaya fruit quality characters, among others; uniformity of size and color, integrity, free from defects such as burns, skin wounds, because insects and pathogens as well as picking the right time.

One of the opportunities for solving these problems is through papaya breeding activities to obtain new superior cultivars that have desirable properties such as high productivity, rapid fruition and resistant to pests and diseases. The general objective of breeding cultivars papaya is getting better than existing cultivars. In Rusnas program (2000) has set the new desired ideotype papaya is: has the property of dwarf trees (dwarf), rapid flowering period (early maturing), high productivity and pest resistant, and suitable for fresh consumption or industrial papain. For fresh consumption, the properties of papaya fruit which is desirable include: small-medium (0.5 - 1.0 kg / fruit) or large (> 3 kg), flesh color orange to red, has a skin color green with red-orange (tinge) in she interrupted, cavity small fruit (edible portion height), rind smooth, the fruit comes from hermaphrodite flowers so that oval (oblong), a textured solid (firm), sweet taste without any bitterness or sense of sap, long shelf life and typical scented. Research carried out aimed to characterize eight papaya genotypes were chosen as elders are Calina, Carisa, Bontang , Ponti. Hibrida 2x1, Dapina, Merah delima, Carmida.

Materials and Methods

The study was conducted in the laboratory of plant breeding and Gardens Agroteknologi Personal Experiment in Saree Aceh Besar. The study was conducted in January to November 2015. The

experiment was arranged in a randomized block design (RAK) non factorial with three replications. The experiment consists of eight papaya genotypes are genotypes Calina, Carisa (from PKHT IPB), Ponti, Bontang (Borneo) so, Carmida, Dapina, Hibrida 2x1 and Merah Delima From Balitbu Solok. Each experimental unit consisted of two plants that the overall amount of 48 plants.

The research begins with; (1) Seeding papaya seeds, papaya seeds that have been prepared beforehand soaked with Atonik with a concentration of 2% for two hours, then planted in polybags, each 2 points per polybag. (2) Preparation of the land, the land that will be used first made land preparation and made beds with a width of 2 meters and a height of 0.2 meters. The distance between beds 0.5 meters. Above the beds are made planting hole with a size of 40 x 40 x 40 cm. Spacing used was 2.5 m X 2.5 m. Planting hole left for 3 days and then put manure to the planting hole or cover up as much as 50 kg. (3) Planting is done during the 2-month-old seedlings, or the average number of leaves 5 pieces. (4) Fertilization of NPK (16:16:16) the dose used is the recommended dose of fertilizer papaya. Maintenance done that watering twice a day if it does not rain, controlling bully orgaisme mechanically and chemically. Weeds are controlled manually.

The parameters observed in experimental It consists of quantitative and qualitative data. Qualitative data, among others, leaf color, leaf shape, type of plant, flower color, quantitative data among other things, plant height, stem diameter, number of leaves, number of nodes (sections), The length of the node (the longest segment), petiole length of the longest, high location of the first flower. Data were analyzed by ANOVA, if the real F test conducted further test DMRT (Duncan Multiple Range Test) at 5% level.

Results and Discussion

Observations were made after the plant was moved spaciousness , starting at old plants 75 days after planting (DAP) or 30 days after transplanting. Results of analysis of variance showed that growth in the field of eight genotypes at 75 days after planting showed the same plant height. The difference is very apparent in the 90 and 115 HST observations (Table 1). Based on the criteria of superior papaya Calina and Merah delima can be selected as a parent because both the genotype short . Age 90 HST almost all genotypes have started flowering. Based Rusnas (2000) has set the new desired ideotype papaya is: has the property of dwarf trees (dwarf).

Table 1. Plant height of four genotypes of papaya

Genotype	Plant Heigt (cm)		
	75 DAP	90 DAP	115 DAP
Carisa	62.83	67.00 ab	112.66 bc
Hibrida 2x1	63.16	87.16 c	137.66 d
Calina	45.33	59.66 a	86 .00 a
Carmida	61.66	76.50 abc	120.00 cd
Ponti	61.16	74.83 abc	92.66 ab
Dapina	65.50	77.50 abc	124.00 cd
Bontang	63.50	84.66 bc	117.00 cd
Merah Delima	51.83	65.33 a	84.00 a

Note: The numbers followed by same letters in the same column do not significantly different base on DMRT at 5%. DAP (days after planting).

Papaya stem diameter observed eight genotypes showed significant differences from 75 to 115 dap. Diameter is a character that shows the robustness of a plant, the larger the diameter of the stem then the sturdy plants. At the 90 days after planting, papaya plants have entered the generative phase, almost all genotypes have a big stem diameter is between 4:36 to 5.26 cm. Only two genotypes that have a small diameter rod that is merah delima and ponti.

Table 2. Diameter of stem of four papaya genotypes

Genotype	Diameter of Stem(cm)		
	75 DAP	90 DAP	115 DAP
Carisa	2.15bc	3.31bc	4.63ab
Hibrida 2x1	2.35c	3.83c	5.20b
Calina	1.81ab	3.15b	4.56ab
Carmida	2.23bc	3.38bc	5.26b
Ponti	1.81ab	2.26a	3.60a
Dapina	2.41c	3.48bc	5.23b
Bontang	2.55c	3.60bc	4.36ab
Merah Delima	1.46a	2.26a	3.33a

Note: The numbers followed by same letters in the same column do not significantly different base on DMRT at 5%.DAP (days after planting)

The number of nodes were measured at the time the plant entered the generative phase . Generative phase is characterized by the release of interest. Almost all genotypes entering the phase geratif at 90 dap, except ruby late entering the generative phase. The number of nodes show high variation , the lowest number of nodes on the genotype Calina, ponti and ruby red. The number of nodes is closely associated with the fruit produced. High first flowers are also very varied, but high in fruit less varied. Location of the first fruits lowest in Calina and ruby, while six other genotypes have the location of the first pieces that did not differ.

Table 3. Numbers of Node (ruas), Heigt of first flower and Heigt of first fruit

Genotype	Numbers of node	Heigt of first flower (cm)	Heigt of first fruit (cm)
Carisa	15.16 c	60.50cd	82.50b
Hibrida 2x1	14.00c	66.33d	89.83b
Calina	10.16a	37.00a	52.50a
Carmida	14.33c	53.50bc	82.50b
Ponti	11.16ab	51.16b	86.16b
Dapina	12.83bc	59.33bcd	93.83b
Bontang	13.00bc	56.50bc	87.66b
Merah Delima	10.16a	43.33a	57.66a

Note: The numbers followed by same letters in the same column do not significantly different base on DMRT at 5%.DAP (days after planting)

Conclusion

The observation of the performance of the vegetative characters of the eight papaya genotypes were tested shown that papaya plant genotype Calina has a shorter plant display . As for the character and the number of stem diameter showed no difference between the four genotypes tested. Genotype ponti has a longer flowering time compared with 3 other genotypes are Calina, Carisa and Bontang. High- interest first emerged shows that high interest Calina has the shortest compared to three other genotypes. Types of plants hermaphrodite is highest in genotype Calina and, while ponti not indicate the type of plant that is obviously because of the interest that arises is still very small time of observation 90 days after planting, Bontang produced three types of plants are female (40 %), male (20 %) and hermaphrodite (40 %). This is presumably because the source of the seed used to bontang obtained through open-pollinated the female plants.

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